

2012 MOTOTRBO ADP CONFERENCE

Extended IP Network Using MOTOTRBO Radio

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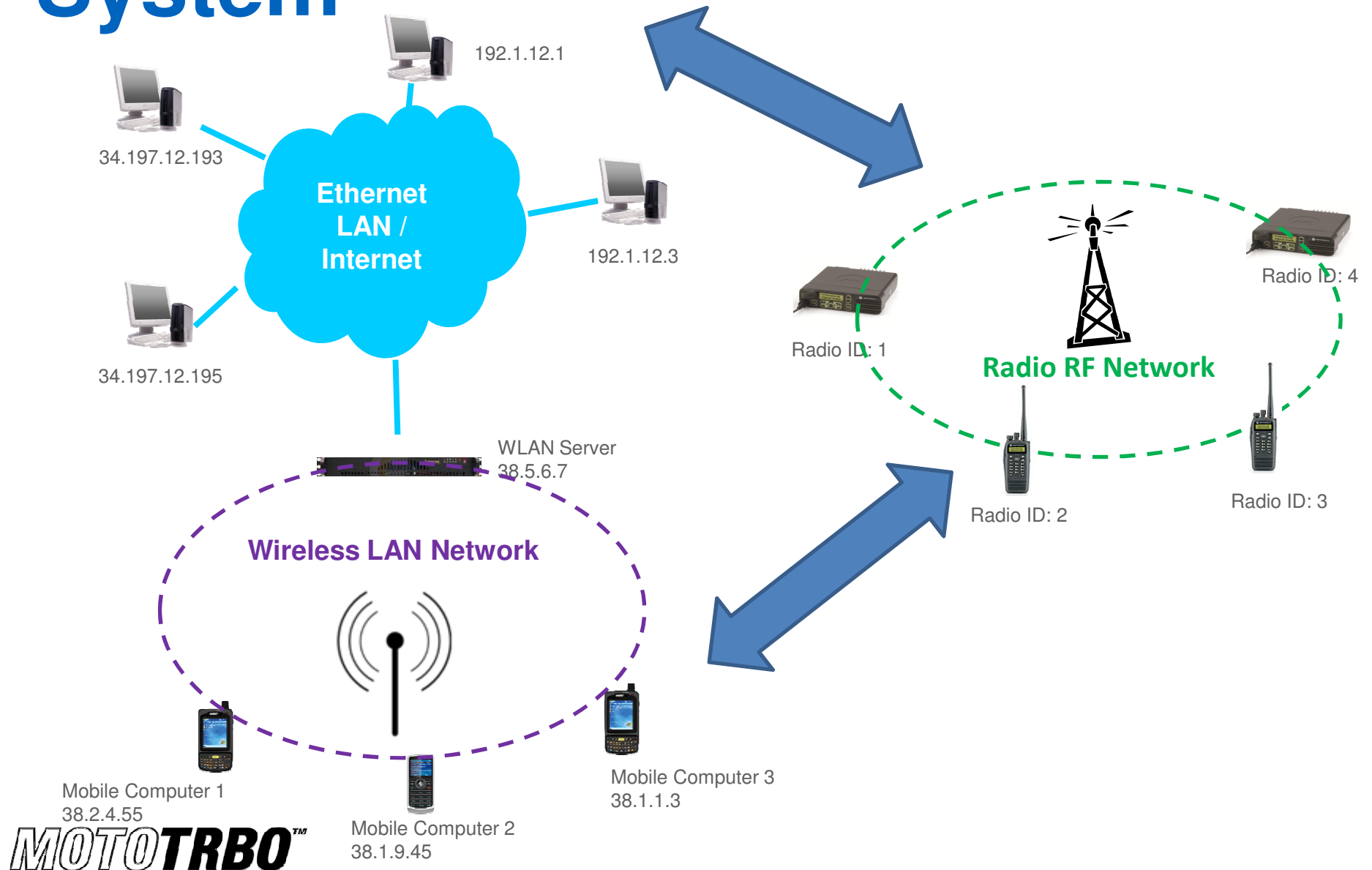
Agenda

1. Overview on Radio IP Network
2. Radio Data Services
3. Hands-on Experience

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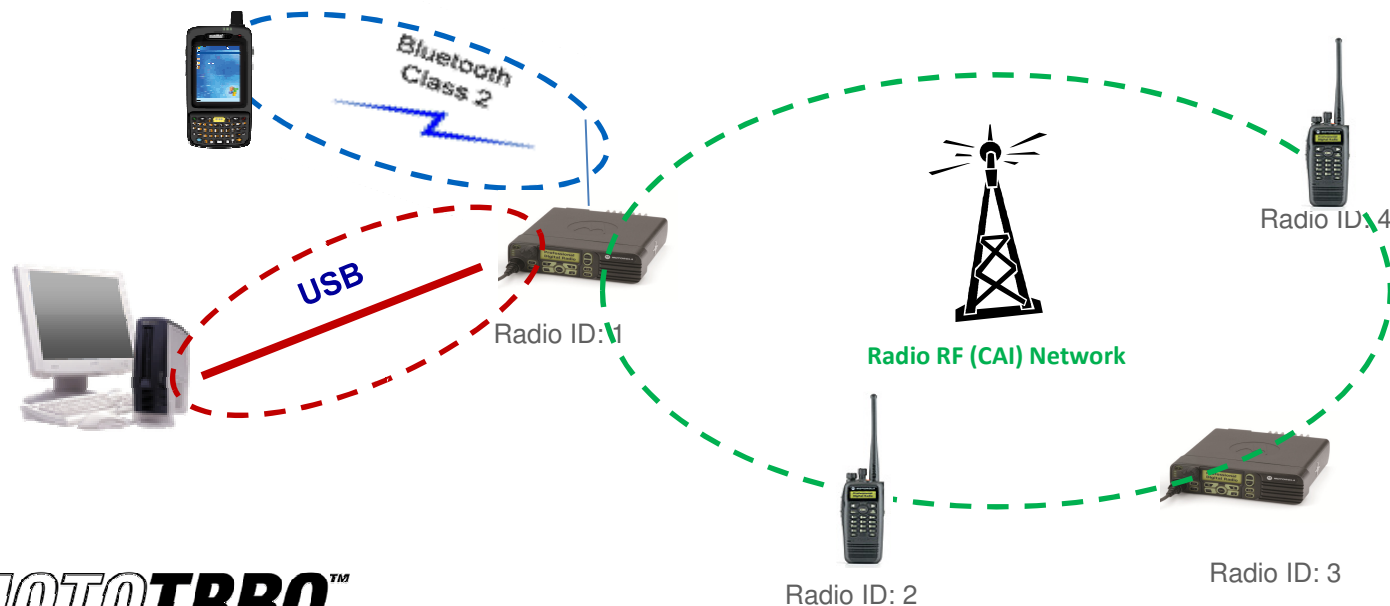
Networking with Different System





Radio IP Networks

- Radio RF Network
- USB Based Private Radio Network
- Bluetooth PAN Based Private Radio Network



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IP Address at RF Network (Common Air Interface)



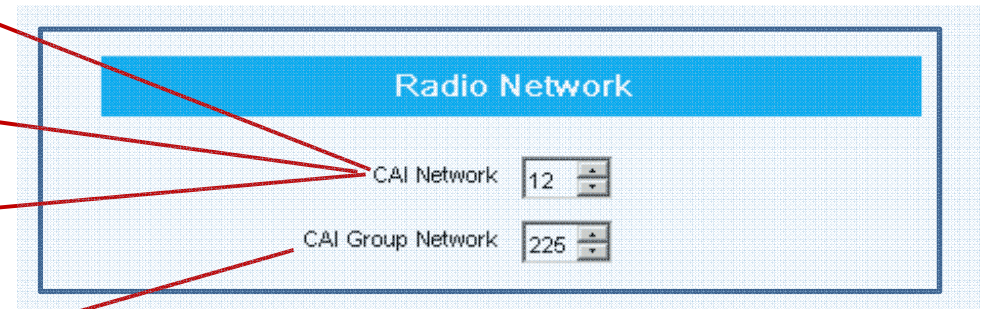
Derive IP address from Radio ID or Group ID

Radio Network IP (12.x.y.z):
Network ID + Radio ID

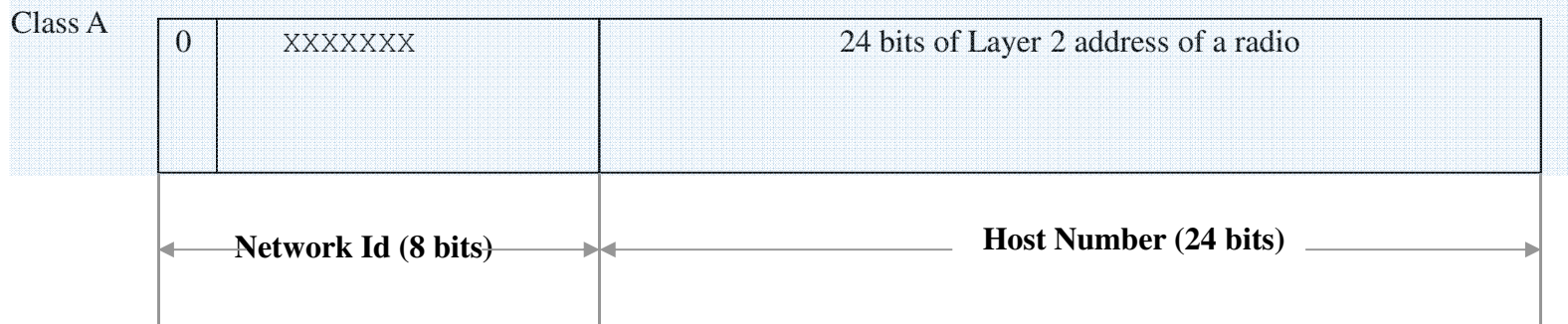
IP capable USB peripheral Network
(13.x.y.x):
(Network ID+1) + Radio ID

IP capable BlueTooth peripheral
Network (14.x.y.z):
(Network ID+2) + Radio ID

Talkgroup Network (225.x.y.z) :
Group Network ID + TalkGroup ID

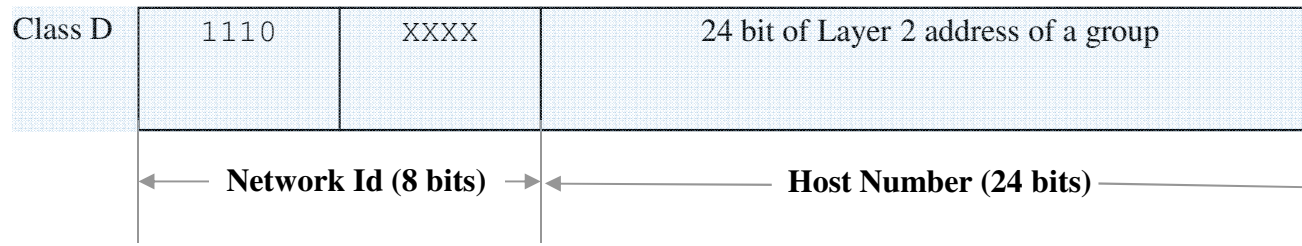


Radio Network IP Address In MOTOTRBO CAI Radio Network



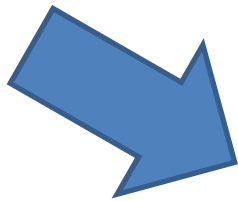
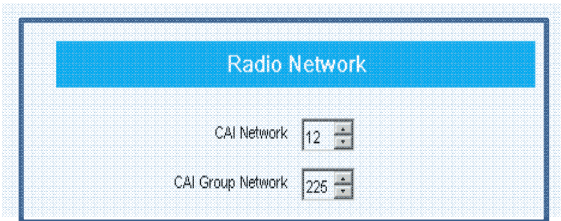
- Example: Radio ID (24bit) = 257,
Network ID = 12
 - Convert to hex = 000101
 - Separate into 8-bit section: 00 01 01
 - Each 8 bit section represents 1 octet of the IP address
 - Convert each section into decimal: 0, 1, 1
 - Radio Network IP address = 12.0.1.1
 - PC-attached Network IP address = 13.0.1.1

Talkgroup IP Address In MOTOTRBO CAI Radio Network



- Example: Group ID (24bit) = 100, network address = 225
 - Convert to heximal = 000064
 - Separate into 8-bit section: 00 00 64
 - Each 8 bit section represents 1 octet of the IP address
 - Convert each section into decimal: 0, 0, 100
 - IP address = 225.0.0.100

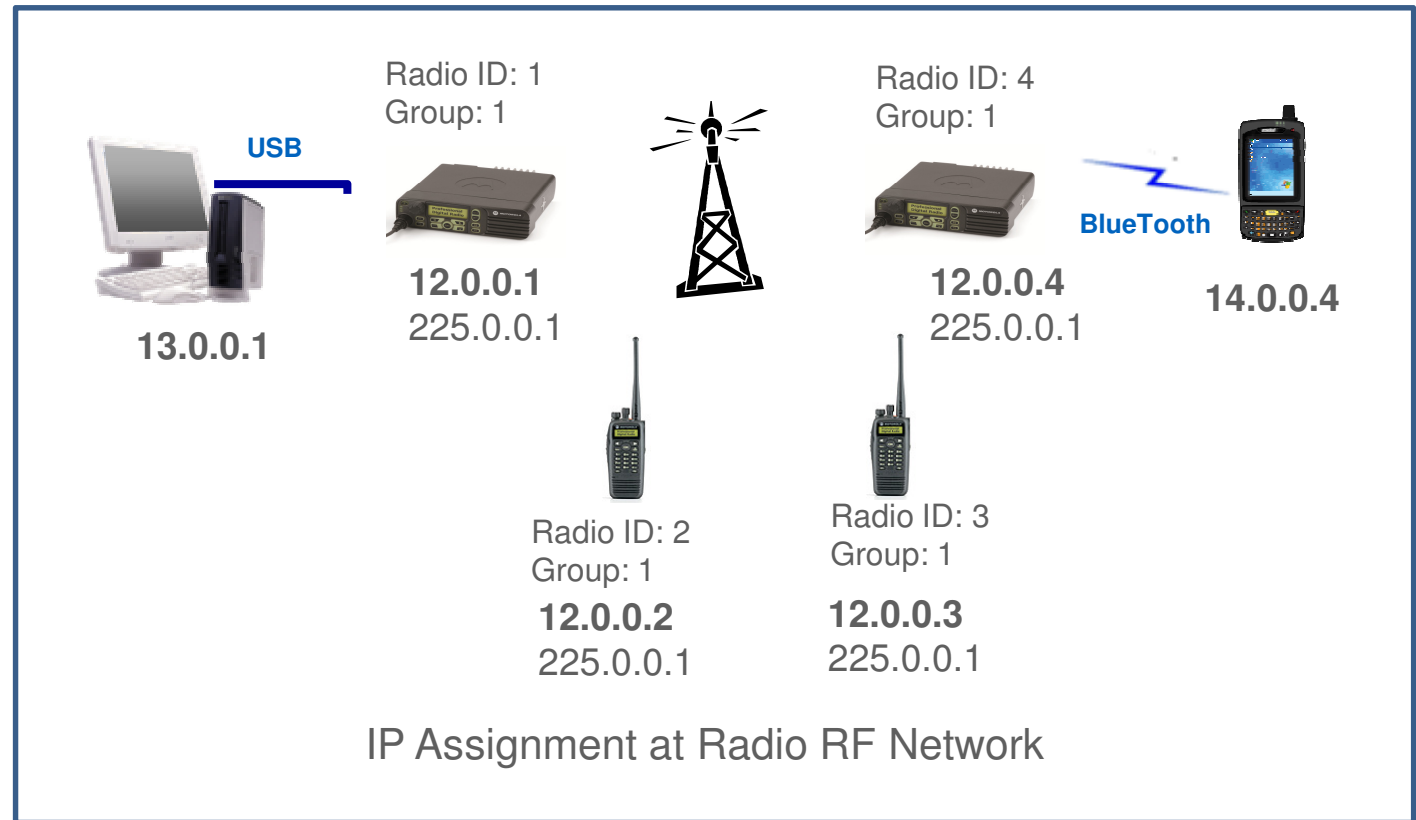
IP Address Scheme at CAI Network



**Automatically IP
Address
Assignment**

Based on the
Radio ID, CAI
Network ID and
CAI Group
Network ID

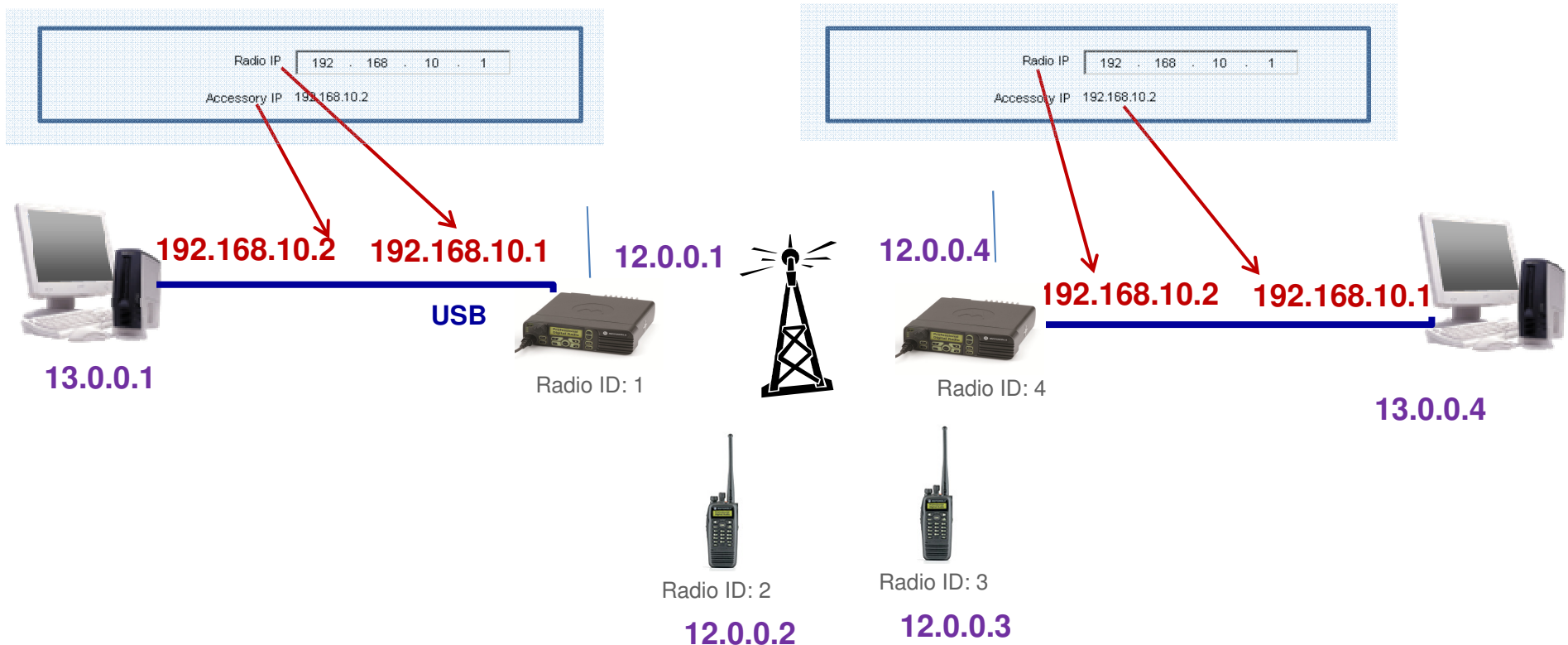
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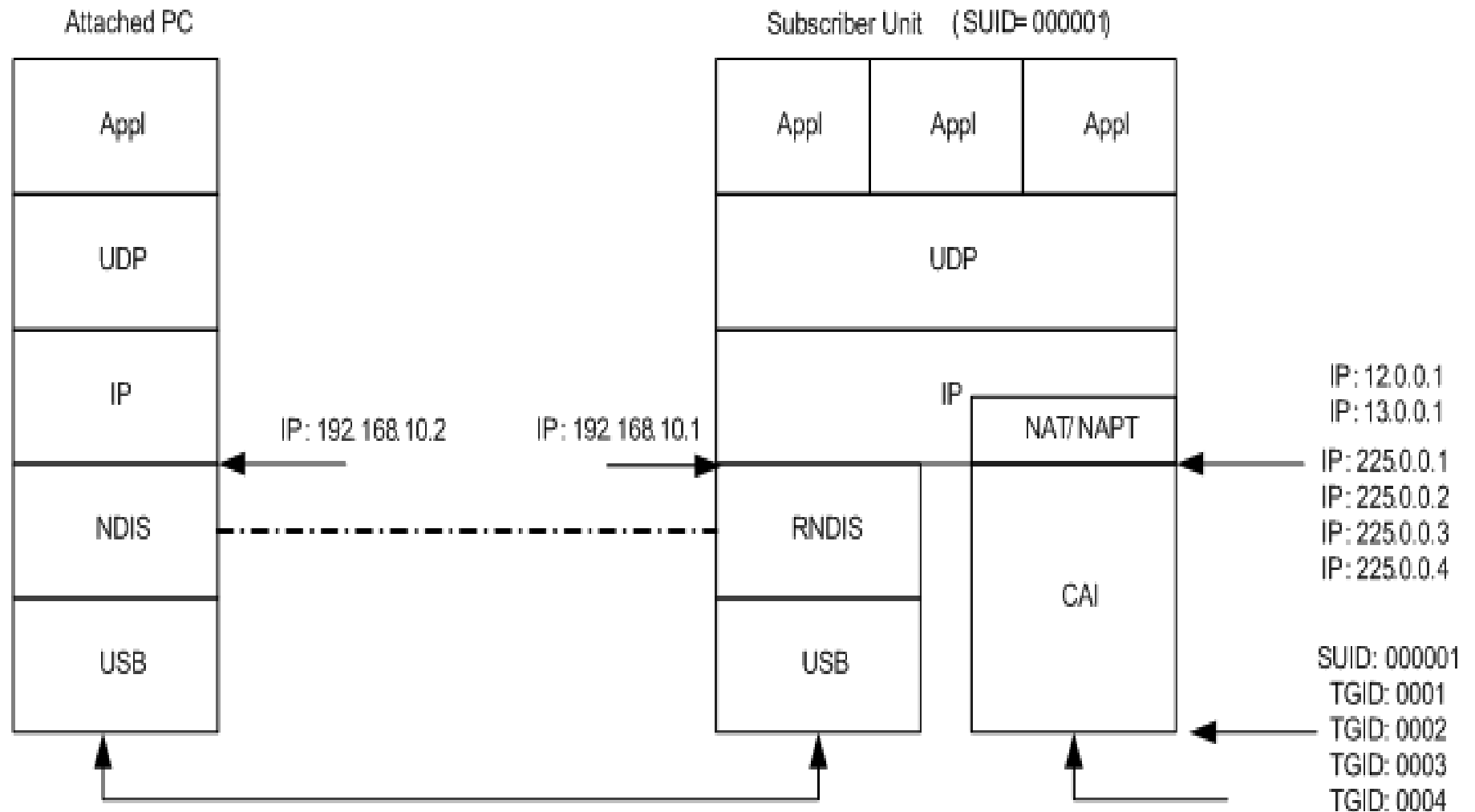
IP Address at USB Based Private Radio Network



- Radio assigns PC an IP address at the USB connection



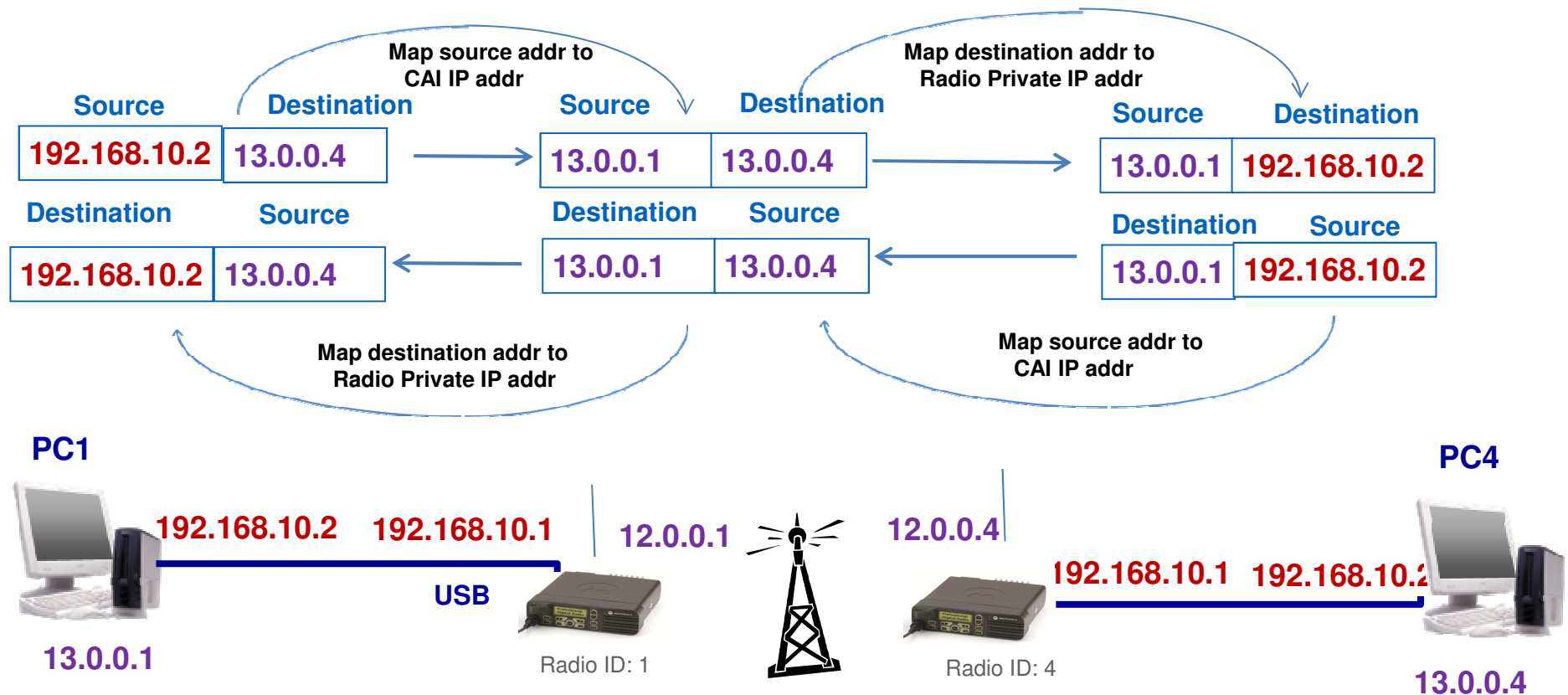
IP Address Translation



IP Address Translation Example



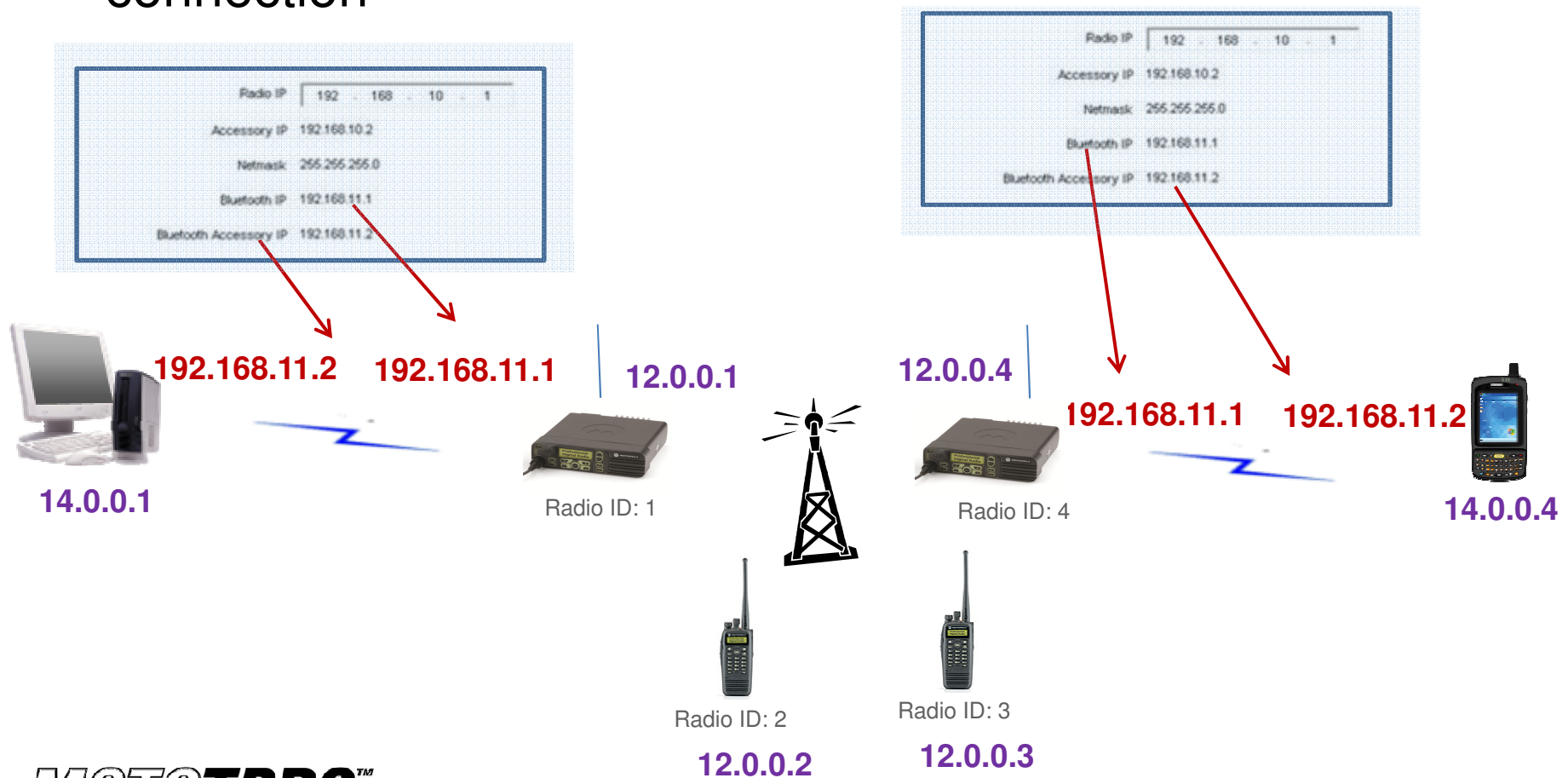
- PC1 sends message to PC4, and PC4 replies to PC1



IP Address at BlueTooth PAN Based Private Radio Network

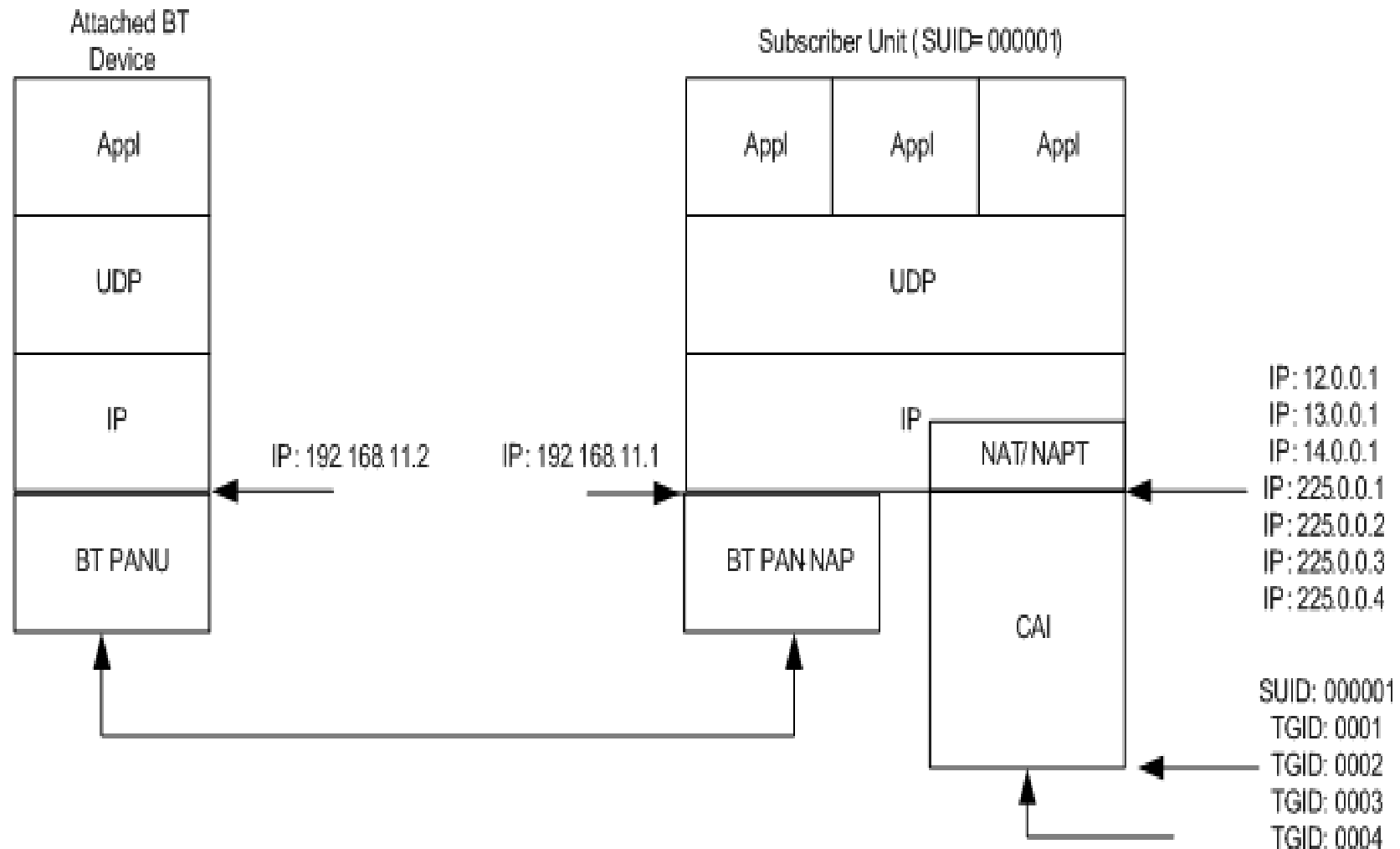


- Radio assigns PC an IP address at the Bluetooth connection



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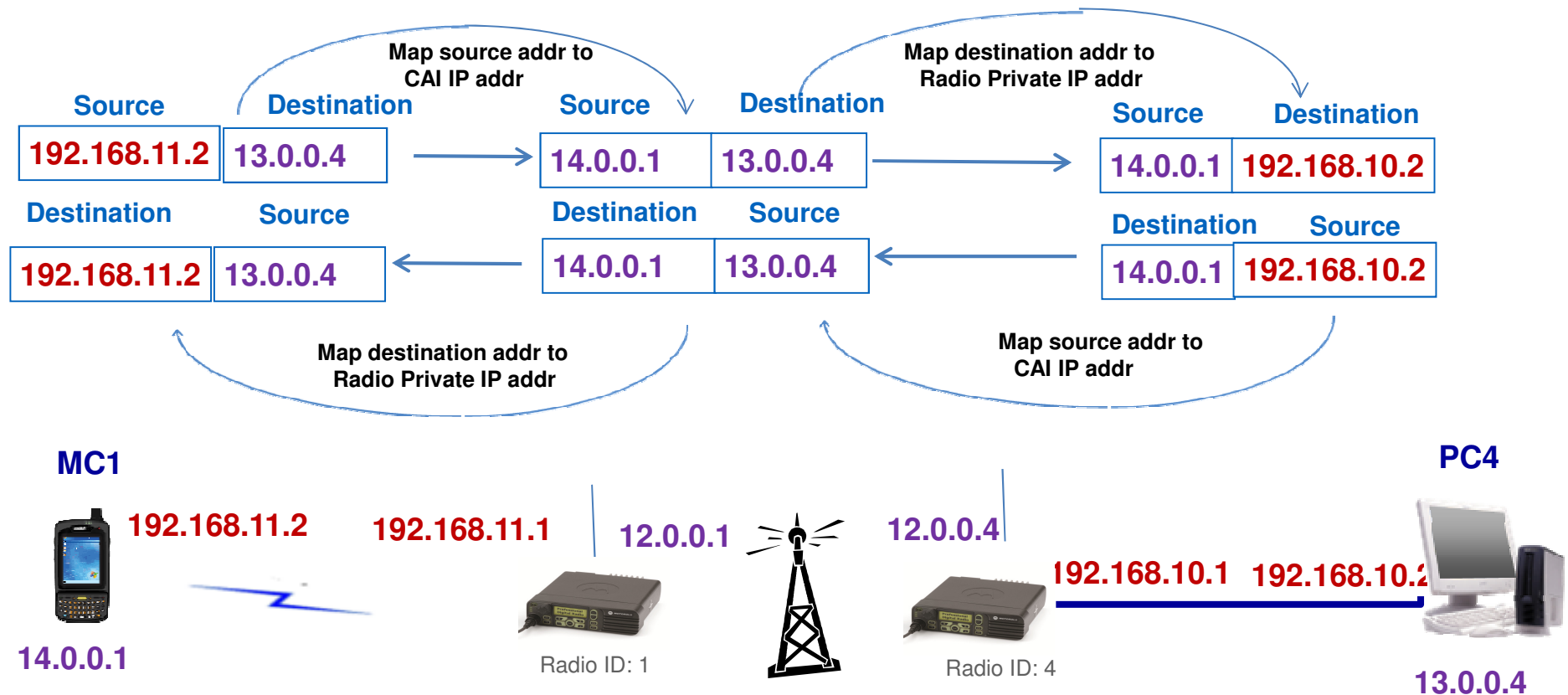
IP Address Translation



IP Address Translation Example



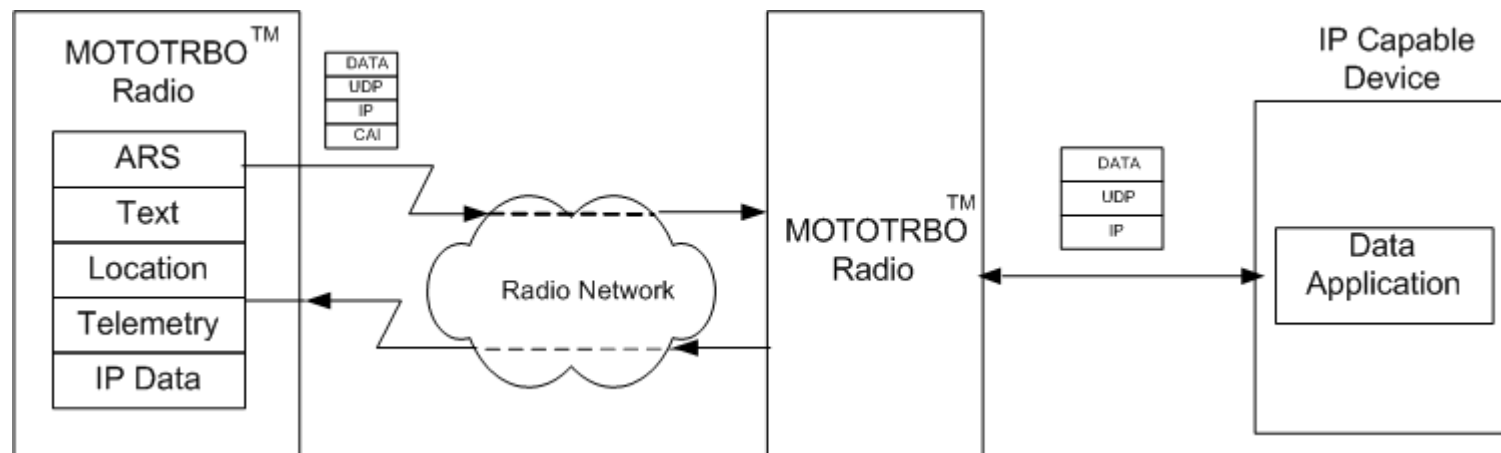
- MC1 sends message to PC4, and PC4 replies to MC1



Radio Data Service

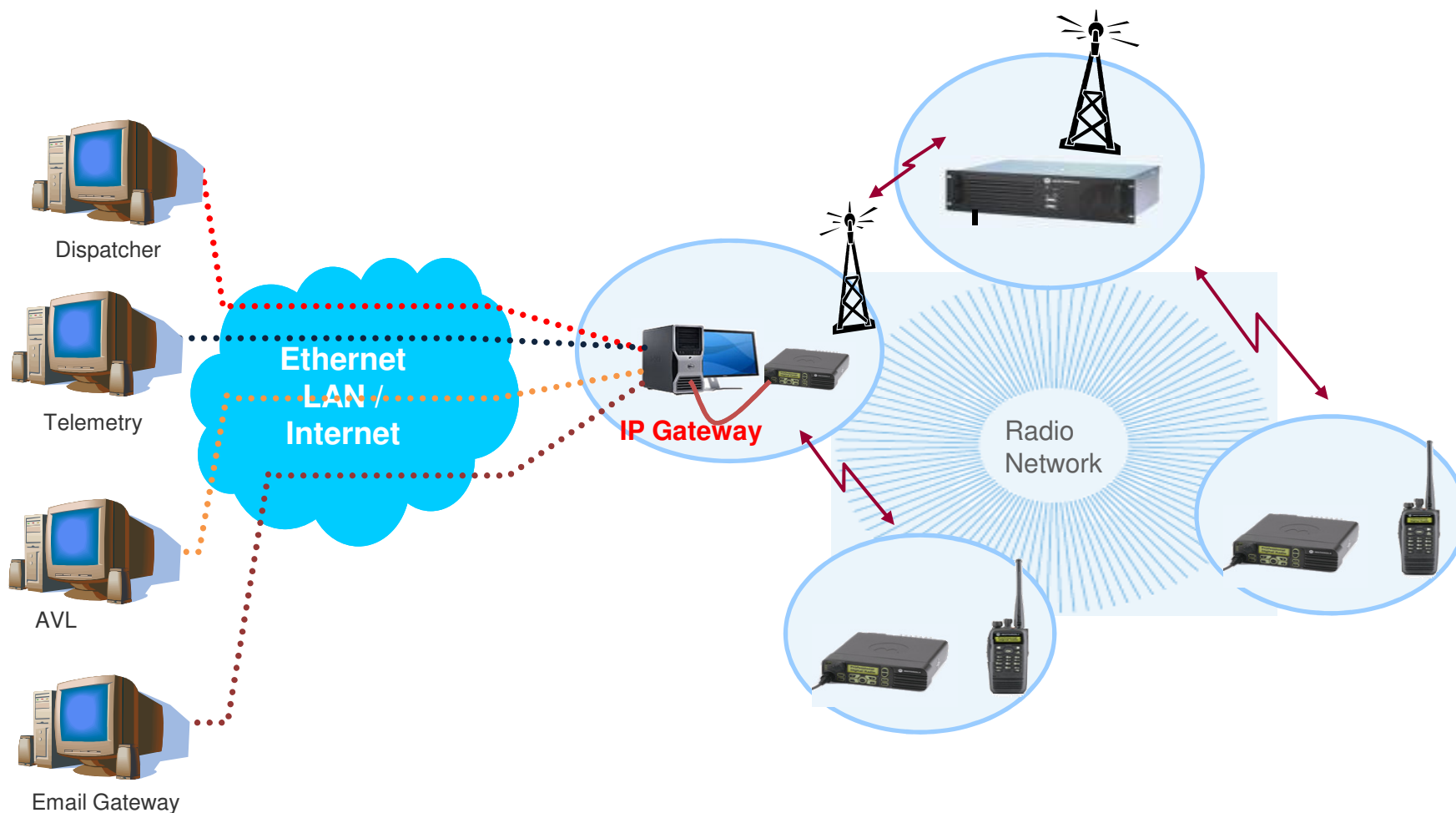


- Automatic Registration Service (4005)
- Text Message (4007)
- Location (4001)
- Telemetry (4008)
- IP Data



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Extended Radio Network



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Extended Bluetooth Connection



Vertical Asset Tracking (VAT) Topology



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Hand-on Workshop on USB based Connection

MOTOTRBO USB Driver Overview



- MOTOTRBO USB Driver is a Microsoft signed driver to support for the MOTOTRBO radios
- Support Operating Systems:
 - » Microsoft® Windows® Server 2003
 - » Microsoft® Windows Server 2008 R2
 - » Microsoft® Windows 7™ Home/Professional Edition (32-bit and 64-bit)
 - » Microsoft® Windows Vista™ Home/Business Edition
 - » Microsoft® Windows® XP Home/Professional Edition
- Download:
<https://mototrbo.dev.motorolasolutions.com/DocumentationTools/DataServices/USBDriver.aspx>

Data Routing – USB Based Private Radio Network



- Radio IP routing entry is automatically added into the PCs routing table:

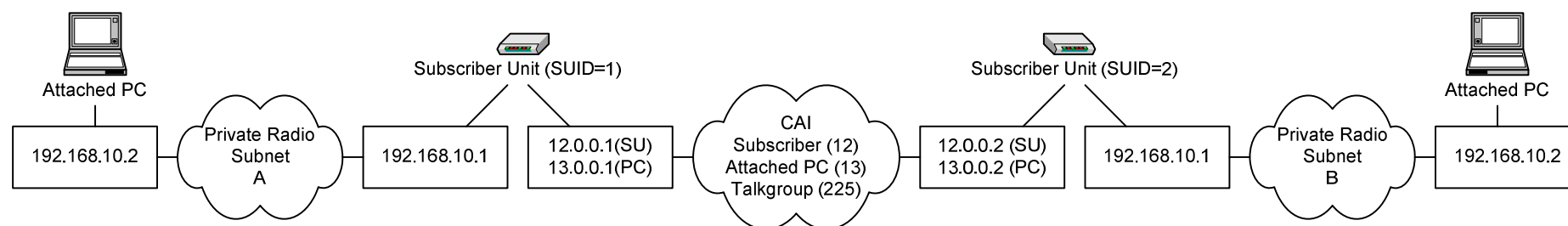
Destination	Netmask	Gateway	Interface
192.168.10.0	255.255.255.0	192.168.10.2	192.168.10.2

- Run Ping command at PC

```
C:\ ping 192.168.10.1
```

- For over the air data communication, additional routing entry has to be added

Data Routing – Radio CAI Network



- Add routing entry for Radio CAI IP address:

■ `C:\route ADD 12.0.0.0 MASK 255.0.0.0 192.168.10.1 METRIC 15 -p`

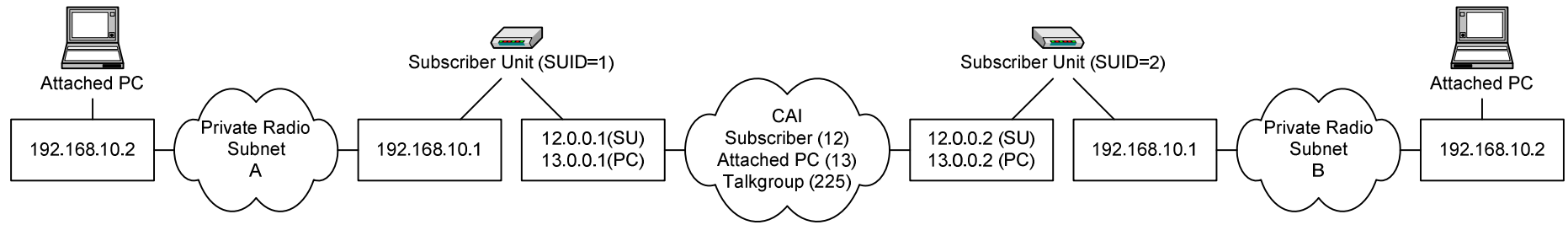
- Add routing entry for Accessory CAI IP address:

■ `C:\route ADD 13.0.0.0 MASK 255.0.0.0 192.168.10.1 METRIC 15 -p`

- Add routing entry for Radio CAI Talkgroup IP address:

■ `C:\route ADD 225.0.0.0 MASK 255.0.0.0 192.168.10.1 METRIC 15 -p`

Data Routing – Verify Routing Entry



- Run Ping command at PC1

- C:\ ping 192.168.10.1
- C:\ ping -w 3000 12.0.0.2
- C:\ ping -w 3000 13.0.0.2
- C:\ ping -w 3000 14.0.0.2
(if Bluetooth connected)



THANK YOU!